

NEW HOST / PARASITOID RECORDS FOR AUSTRALIAN PENTATOMIDAE, TACHINIDAE AND BRACONIDAE

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Abstract

New host / parasitoid records are provided for five species of Pentatomidae (host), seven species of Tachinidae and one species of Braconidae (parasitoids). Tachinids of the genera *Alophora* Robineau-Desvoidy, *Cylindromyia* Meigen and *Pentatomophaga* de Meijere (all Phasiinae), an undetermined genus of Tachininae and a species of the euphorine braconid genus *Aridelus* Marshall, are recorded from the pentatomids *Piezodoros hybneri* (Gmelin), *Dictyotis caenosus* (Westwood), *Plautia affinis* Dallas, *Cuspicona simplex* Walker and *C. forticornis* Breddin.

Introduction

Plant feeding bugs of the family Pentatomidae include economically important pests attacking a wide range of horticultural and agricultural crops. The introduced green vegetable bug *Nezara viridula* (L.) and native species such as *Piezodoros hybneri* (Gmelin), *Plautia affinis* Dallas and *Cuspicona simplex* Walker, attack various fruit, vegetable and legume crops causing fruit drop, distortion and wilting (Gross 1975, Miller *et al.* 1977, Clarke 1992). Records of natural enemies attacking these and other species in Australia are largely restricted to hymenopteran egg parasitoids (Boucek 1988, Johnson 1991). There are no prior records of parasitoids completing development in the damaging nymphal stages and few records of development in the adult stage of Australian pentatomid bugs.

Materials and methods

A survey of nymphal and adult parasitoids of Pentatomidae was conducted at sites in south-eastern Queensland (Brookfield, Indooroopilly and Caboolture) and northern New South Wales (Biniguy) during 1994-1996. Host / parasitoid records were compiled for seven species of Tachinidae and one species of Braconidae recovered from five species of Pentatomidae (Table 1). Where species determinations were not possible, accession numbers were assigned (LPL) and specimens lodged with the CSIRO Long Pocket Laboratories, Brisbane.

Results

Four tachinid species were recovered from *P. affinis*, two each from *P. hybneri* and *C. simplex* and one each from *D. caenosus* (Westwood) and *C. forticornis* Breddin (Table 1). All tachinids were recovered from adult hosts except LPL 9438, which was also recovered from late instar nymphs of *P. affinis*. The braconid *Aridelus* sp. (Euphorinae: LPL 9436), was recovered from 5th instar nymphs of *P. affinis* and *C. simplex*. Collection of several thousand *N. viridula* nymphs and adults recovered no parasitoids.

Table 1. New pentatomid / parasitoid records.

Pentatomid host	Parasitoid	Host plant	Locality
	TACHINIDAE		
<i>Cuspicona forticornis</i>	<i>Alophora</i> sp. (LPL 9445)	<i>Solanum mauritianum</i> Scop. (wild tobacco)	Brookfield
<i>Cuspicona simplex</i>	Tachininae (LPL 9438)	<i>S. mauritianum</i>	Brookfield
	<i>Alophora</i> sp. (LPL 9445)	<i>S. mauritianum</i>	Brookfield
<i>Dictyotus caenosus</i>	<i>Cylindromyia bimaculata</i> (Walker)	<i>Medicago sativa</i> (L.) (lucerne)	Biniguy
<i>Piezodorus hybneri</i>	<i>Alophora</i> sp. (LPL 9417)	<i>M. sativa</i>	Biniguy
	<i>Cylindromyia rufifemur</i> Paramanov*	<i>M. sativa</i>	Biniguy
<i>Plautia affinis</i>	Tachininae (LPL 9438)	<i>S. mauritianum</i>	Indooroopilly
	<i>Alophora</i> sp. (LPL 9445)	<i>S. mauritianum</i>	Brookfield
	<i>Alophora</i> sp. (LPL 9463)	<i>Ricinus communis</i> L. (castor oil)	Biniguy
	<i>Pentatomophaga bicincta</i> de Meijere	<i>Rubus idaeus</i> L. (raspberry)	Caboolture
	BRACONIDAE		
<i>Plautia affinis</i>	<i>Aridelus</i> sp. (LPL 9436)	<i>S. mauritianum</i>	Brookfield
		<i>R. idaeus</i>	Caboolture
<i>Cuspicona simplex</i>	<i>Aridelus</i> sp. (LPL 9436)	<i>S. mauritianum</i>	Brookfield

* Also recorded by Cantrell (1984, 1986).

Discussion

Tachinidae are an important group of parasitoids, having been used extensively as biological control agents (see review by Grenier 1988). Previously, host records were available for only one Australian species attacking Pentatomidae (Cantrell 1984, 1986), that of *Cylindromyia rufifemur* Paramonov, completing development in *N. viridula* and *P. hybneri*. In addition, two species of American origin, *Trichopoda pennipes* (F.) and *T. pilipes* (F.) were introduced to Australia for the control of *N. viridula* during the period 1940-1950 and again during the early 1980's but both apparently failed to establish (Waterhouse and Norris 1987). Parasitism of hemipterous insects by Tachinidae was previously thought to be restricted to members of

the subfamily Phasiinae (Arnaud 1978, Cantrell 1984, 1986; Belshaw 1993). Recovery of species LPL 9438 (subfamily Tachininae) represents the first record of a species outside of the Phasiinae completing development in an hemipterous insect. The placement of this species remains uncertain, but it is tentatively assigned to the tribe Leskiini. As currently constituted, the Australian Leskiini are undoubtedly polyphyletic and this is reflected in the variety of recorded host associations. The addition of a taxon parasitic in Hemiptera further confuses the tribal identity. Additional specimens of LPL 9438, in the collection of the Queensland Department of Primary Industries, were collected from 'hilltopping' localities in central New South Wales and south-eastern Queensland. A preliminary examination of the male and female terminalia reveals an unusual combination of characters which does not clarify the phylogenetic position of this interesting fly (B. K. Cantrell, *pers. comm.*).

Recorded hosts for Australian Euphorinae include certain species of Lepidoptera, Coleoptera and Orthoptera (Naumann 1991), with no previous records of development in hemipterous hosts. However, Loan (1983) recorded three species of *Aridelus* Marshall parasitising early instar pentatomid nymphs in the Nearctic region, with mortality of the host occurring in the late nymph and adult stages.

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References

- ARNAUD, P.H. 1978. Host-parasite catalogue of North American Tachinidae. *US Department of Agriculture Miscellaneous Publication* No. 1319.
- BELSHAW, R. 1993. Tachinid flies, Diptera: Tachinidae. *Handbooks for the Identification of British Insects* 10: 1-169.
- BOUCEK, Z. 1988. *Australasian Chalcidoidea (Hymenoptera). A biosystematic revision of genera of fourteen families, with a reclassification of species.* CAB International Institute of Entomology, Wallingford, UK.
- CANTRELL, B.K. 1984. Synopsis of the Australian Phasiinae, including revisions of *Gerocyptera* Townsend and the Australian species of *Cylindromyia* Meigen (Diptera: Tachinidae). *Australian Journal of Zoology Supplementary Series* 102: 1-60.
- CANTRELL, B.K. 1986. An updated host catalogue for the Australian Tachinidae (Diptera). *Journal of the Australian Entomological Society* 25: 255-265.

- CLARKE, A.R. 1992. Current distribution and pest status of *Nezara viridula* (L.) (Hemiptera: Pentatomidae) in Australia. *Journal of the Australian Entomological Society* **31**: 289-297.
- GRENIER, S. 1988. Applied biological control with tachinid flies (Diptera: Tachinidae): a review. *Anzeiger fur Schadlingskde., Pflanzenschutz, Umweltschutz* **61**: 49-56.
- GROSS, G. 1975. *Plant-feeding and other bugs (Hemiptera) of South Australia*. 2 Vols; 501 pp. Government Printer, South Australia.
- JOHNSON, N.F. 1991. Revision of Australasian *Trissolcus* species (Hymenoptera: Scelionidae). *Invertebrate Taxonomy* **5**: 211-239.
- LOAN, C. 1983. Host and generic relations of the Euphorini (Hymenoptera: Braconidae). *Contributions of the American Entomological Institute* **20**: 388-397.
- NAUMANN, I.D. 1991. Hymenoptera. In CSIRO (ed.) *The insects of Australia. A textbook for students and research workers*. 2 Vols; 560 + 600 pp. Melbourne University Press, Carlton.
- MILLER, L. A., ROSE, H.A. and MCDONALD, J.F.D. 1977. The effects of damage by the green vegetable bug, *Nezara viridula* (L.) on yield and quality of soybeans. *Journal of the Australian Entomological Society* **16**: 421-426.
- WATERHOUSE, D.F. and NORRIS, K.R. 1987. *Biological control, Pacific prospects*; 454 pp. Inkata Press, Melbourne.